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Invention: SPEAKER-PROVIDED MOUNTING TABLE

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SPECIFICATION

SPEAKER-PROVIDED MOUNTING TABLE

BACKGROUND OF THE INVENTION

(Field of the Invention)

The present invention relates to a mounting table provided with a speaker, which is used for mounting various types of apparatus such as an outputting apparatus required to output audio signals.

(Description of Related Art)

A conventional mounting table has typically been configured to have a pedestal and support members for supporting the pedestal. These support members have been made in a hollow shape.

In addition, a bass-reflex type of speaker is known as a speaker that has the capability of enhancing a lower-band sound, in which sound emitted from the back of the speaker is utilized to extend a limit to replay a lower-band sound, which provides an enhanced lower sound band. The bass-reflex type of speaker includes a speaker and a hollow-shaped port at which a box is placed, the speaker being incorporated in the box. In this speaker, a resonance is made to generate at a particular wavelength based on a port length and a box capacity.

However, the conventional mounting table has been directed to a mere multipurpose use. If desired, apparatuses, such as video apparatuses that output audio signals, can be mounted simply on the mounting table. Thus, it is concluded that the conventional mounting table has only a simple function of accepting such apparatuses to be mounted.

Meanwhile, it is frequent that the conventional speaker capable enhancing a lower-band sound has a structure in which its acoustic capacity could not be increased any more, even if the acoustic capacity is desired to be larger.

If the mounting table is equipped with output apparatuses, such as a speaker, mounted thereon, there occurs the problem that the capacity and weight of the mounting table increase largely. In contrast, to avoid this problem, a simply structured output apparatus whose capacity and weight is suppressed from increasing could be mounted on the mounting table. There is however another problem that the capacity of replaying a lower-band sound is not sufficient.

The problems to be solved by the present invention include the above-mentioned problems as examples.

SUMMARY OF THE INVENTION

The present invention has been made in view of the above circumstances, and an object of the present invention is, therefore, to provide a mounting table provided with a speaker, which is capable of enhancing a lower-band sound with ease, without substantially increasing the volume and weight of the mounting table.

In order to realize the above object, the present invention provides, as one aspect thereof, a speaker-provided mounting table, comprising: a pedestal (10); a hollow-shaped support member (20) for supporting the pedestal, the support member also functioning as an acoustic pipe; and a speaker unit (26) being equipped with the speaker and being attached on the support member.

The present invention provides, as another aspect thereof, a pedestal (10); a hollow-shaped support member (26) for supporting the pedestal, the support member also functioning as an acoustic capacity; and a speaker unit (26) being equipped with the speaker and being attached on the support member.

In the above configurations of the present invention, for the sake of an easier understanding of the present invention, the references cited in the drawings have been added to each component in parentheses. However, it should be understood that this manner of adding the references do not mean to limit the scope of the present invention to the configurations expressed by the embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and aspects of the present invention will become apparent from the following description and embodiments with reference to the accompanying drawings in which:

Fig. 1 shows an external view of a video-apparatus mounting table serving as a speaker-provided mounting table according to a first embodiment of the present invention;

Fig. 2 shows the right side view of the video-apparatus mounting table shown in Fig. 1;

Figs. 3 shows a section taken, except a video apparatus, along an A-A' line in Fig. 2;

Fig. 4 shows an external view of a video-apparatus mounting table serving as the speaker-provided mounting table according to a second embodiment of the present invention;

Fig. 5 shows the right side view of the video-apparatus mounting table shown in Fig. 4;

Fig. 6 shows a section taken, except a video apparatus, along an A-A' line in Fig. 5;

Fig. 7 shows an external view of a video-apparatus mounting table serving as the speaker-provided mounting table according to a third embodiment of the present invention;

Fig. 8 shows the right side view of the video-apparatus mounting table shown in Fig. 7; and

Fig. 9 shows the rear view of the video-apparatus mounting table shown in Fig. 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Preferred embodiments of a speaker-provided mounting table according to the present invention will now be described with reference to Figs.1 to 9.

(First embodiment)

Referring to Figs. 1 to 3, a first embodiment of the speaker-provided mounting table will now be explained. Fig. 1 shows an external view of a video-apparatus mounting table 1 according to the first embodiment, which serves as the speaker-provided mounting table, Fig. 2 shows the right side view of the video-apparatus mounting table shown in Fig. 1, and Figs. 3 shows a section taken, except the video apparatus, along an A-A' line in Fig. 2. For the sake of making the following explanation easier, a direction along which the front (shown in Fig. 1) of the video apparatus turns is referred to as a forward direction, while the opposite direction to the forward direction is referred to as a backward direction.

As shown in Fig. 1, the video-apparatus mounting table 1, which serves as the speaker-provided mounting table according to the first embodiment, includes a rectangular pedestal 10 and support members

20 and 25. The pedestal 10 is placed to permit a video apparatus 5, such as a TV set, to be mounted thereon. The support members 20 and 25 are provided to support the pedestal at both the forward and backward portions of the pedestal 10. Each of the support members 20 and 25 is shaped into a hollow form. The support members 20 and 25 are disposed at positions on the lower surface of the pedestal 10 at predetermined intervals in parallel or obliquely to each other in the backward and forward direction. In addition, both ends of each of the support members 20 and 25 are bent at their predetermined middle positions so that both end surfaces are able to touch the ground.

In the front or back near to each end of the support member 20, which is secured on the frontal position of the pedestal 10, an aperture port 21 is formed to allow sound to be emitted outward. In the present embodiment, an elliptically shaped speaker unit is chosen, an elliptical opening 22 is formed in the back of the support member 20. The opening 22 is located so that each distance from the opening 22 to each aperture port 21 becomes a given amount (for instance, the same given amount of distance is applied to both the distances). To the opening 22 is connected one end of a connection member 24 in which there is formed an acoustic capacity cavity 23 having a predetermined amount of capacity. The remaining end of the connection member 24 is coupled with the speaker unit 26. The speaker unit 26 is positioned face to face to the connection member 24 in the acoustic emitting direction. The connection member 24 may be solely formed to connect with the support member 20 or integrally formed with the support member 20, as long as an acoustic capacity of the acoustic capacity cavity 23 and an acoustic pipe established by the support member 20 operate in a cooperative manner. The support member 20 may be formed so as to function as an acoustic capacity.

The speaker unit 26 is configured by having, for example, an attaching member 27 to attach a speaker to other members, a speaker body 28 provided with a vibration plate to emit sound, and an input terminal 29 to input audio signals to the speaker body 28. The speaker body 28 is electrically connected to the input terminal 29. In addition, both of the speaker body 28 and the attaching member 27 are produced as one unit. The speaker unit 26 is secured to the connection member

24 with the aid of the attaching member 27.

The speaker unit 26 is made of, for example, a dynamic electricity type of speaker or a piezoelectric type of speaker. Employing the dynamic electricity type of speaker makes it possible to output sound of which frequency range and dynamic range are wide. Meanwhile, the employment of the piezoelectric type of speaker will facilitate work to install the speaker onto a mounting table, because this type of speaker occupies a remarkably reduced amount of volume. Additionally, this employment allows the entire weight of the mounting table, including the speaker, to be reduced to a great extent.

The input terminal 29 of the speaker body 28 is electrically coupled with, for example, the output terminal of a video apparatus 5, such as a TV set or others, which is mounted on the pedestal 10, so that the input terminal 29 receives an output signal from the vide apparatus 5. Since this input terminal 29 is placed to receive audio signals, the input terminal 29 is not always limited to connections with the video apparatus 5, but may be connected to audio apparatuses.

The aperture ports 21 and 21 are positioned in the support member 20 such that a frequency to cause a Helmholtz resonance can be set to a limit necessary to replay a lower-band sound, the Helmholtz resonance being caused on both of an acoustic mass inside (within the acoustic pipe) the support member 20 and an acoustic compliance from the acoustic capacity cavity 23 functioning as an acoustic capacity cavity. In cases where the video-apparatus mounting table 1 is used as means for generating a pipe resonance, the aperture openings 21 are formed at specific positions where the distance between the speaker unit 26 and each aperture port 21 is determined to have a resonance frequency necessary for the pipe resonance.

An operation, which is given when the video-apparatus mounting table according to the present embodiment is made to function as an acoustic apparatus, will now be provided.

In response to the supply of an audio signal from the vide apparatus 5 to the input terminal 29 of the speaker unit 26, the sound that has been replayed are emitted from the speaker unit 26. The emitted sound undergoes a resonance caused on the internal lengths of the acoustic capacity cavity 23 and the support member 20, the

resonated sound is transmitted to the aperture ports 21 and 21. The replayed sound is therefore emitted outward via the aperture ports 21 and 21.

As described above, the video-apparatus mounting table 1 according to the present embodiment is provided with the hollow-shaped support members 20 and 25, which have been generally used as a structure typical to a multipurpose mounting table. Additionally, one of the support members, 20, is provided with the speaker unit 26 in order to use the support member 20 as an acoustic pipe. Moreover, the support member 20 (including the acoustic capacity cavity 23) is made to operate as means for a Helmholtz resonance or a pipe resonance on audio signals. Alternatively, the support member 20 is used as means for providing an acoustic capacity.

Therefore, the video-apparatus mounting table 1 is available as a speaker that is compact in size has a sufficiently high replay function for a lower-band sound. Specifically, the support member can be used as an acoustic pipe or a member that provides an acoustic capacity, which will eliminate the necessity of increasing the volume and weight of the mounting table. Still, the support member and the others are formed to produce a Helmholtz resonance, thereby particularly providing an increased efficiency in a lower band of sound and remarkably improving quality of replayed sound.

(Second embodiment)

Referring to Figs. 4 to 6, a second embodiment of the speaker-provided mounting table will now be explained. Fig. 4 shows an external view of a video-apparatus mounting table 50 according to the second embodiment, which serves as the speaker-provided mounting table, Fig. 5 shows the right side view of the video-apparatus mounting table shown in Fig. 4, and Fig. 6 shows a section taken, except the video apparatus, along an A-A' line in Fig. 5. Similarly to the first embodiment, for the sake of making the following explanation easier, a forward direction and a backward direction are defined on the direction going away from the front or back of the vide apparatus. Incidentally, the constituents that have already been explained in the first embodiment are noted by the references identical to those in the first embodiment,

thus being omitted from detailed explanations.

As shown in Fig. 4, the video-apparatus mounting table 50, which serves as the speaker-provided mounting table according to the second embodiment, includes a rectangular pedestal 10 and support members 60 and 65. The pedestal 10 is placed to permit a video apparatus 5 to be mounted thereon. The support members 60 and 65 are provided to support the pedestal 10 at both the forward and backward parts of the pedestal 10. Each of the support members 60 and 65 is shaped into a hollow tube. The support members 60 and 65 are disposed at positions on the lower surface of the pedestal 10 at predetermined intervals in parallel or obliquely to each other in the backward and forward direction. In addition, both the support members 60 and 65 are bent at their predetermined middle positions to form rectangles, respectively. In addition, inside the support member 60 secured at a position near to the front on the lower surface of the pedestal 10, two partition walls 70 are placed to partition its inner space into first and second ports. The first and second ports are partitioned to have capacities obtained by dividing the inner capacity of the support member 60 at a given ratio. In the present embodiment, the speaker unit 26 is produced into a circular form, resulting in that circular openings 22 and 22a are formed in the back of the support member 60 and belong to the first and second ports, respectively. The openings 22 and 22a are positioned in the first and second ports so that a distance from each of the openings 22 and 22a to each of later-described aperture ports 61 to 61a shows a predetermined amount (for example, both distances are equal to each other). Because the inner capacity of the support member 60 is partitioned by the two partition walls 70 into the two chambers, those chambers can be resonated at frequencies mutually slightly different from each other.

In the front or back near to each of both ends of the support member 60 that functions as the first and second ports, rectangular aperture ports 61 and 61a are formed to allow sound to be emitted outward, respectively. Each of the aperture ports 61 and 61a is opened at a position in the vicinity of one end of each of the first and second ports. To each of the openings 22 and 22a is connected one end of each of connection members 64 and 64a in each of which there is formed an acoustic capacity cavity 63 (63a) having a predetermined amount of

capacity. The remaining end of each of the connection members 64 and 64a is coupled with each of the speaker units 26. Each speaker unit 26 is positioned face to face to each of the connection members 64 and 64a in the acoustic emitting direction. Each of the connection members 64 and 64a may be solely formed to connect with the support member 60 or integrally formed with the support member 60.

Each of the aperture ports 61 and 61a is positioned so that a frequency to cause a Helmholtz resonance can be set to a limit necessary to replay a lower-band sound, the Helmholtz resonance being caused on both of an acoustic mass inside the acoustic pipe and an acoustic compliance from each of the acoustic capacity cavities 63 and 63a each functioning as an acoustic capacity part. In cases where the video-apparatus mounting table 50 is used as means for generating a pipe resonance, the aperture openings 61 and 61a are formed at specific positions where the distance between each speaker unit 26 and each aperture port 61 (61a) is determined to have a resonance frequency necessary for the pipe resonance.

An operation, which is given when the video-apparatus mounting table according to the present embodiment is made to function as an acoustic apparatus, will now be provided.

In response to the supply of an audio signal from the vide apparatus 5 to the input terminal 29 of each speaker unit 26, the sound that has been replayed are emitted from each speaker unit 26. The emitted sound undergoes a resonance caused by both the acoustic capacity cavity 23 and the acoustic pipe 60, the resonated sound is transmitted to each of the aperture ports 61 and 61a. The replayed sound is therefore emitted outward via each of the aperture ports 61 and 61a.

As described above, the video-apparatus mounting table 50 according to the present embodiment is provided with the hollow-shaped support members 60 and 65, which have been generally used as a structure typical to a multipurpose mounting table. Additionally, one of the support members, 60, is provided with the speaker unit 26 in order to use the support member 60 as an acoustic pipe. Moreover, the support member 60 (including the acoustic capacity cavity 23) is made to operate as means for a Helmholtz resonance or a pipe resonance on audio signals.

Furthermore, the inside cavity of the support member 60 is partitioned into the first and second ports, while each of the two connection members 64 and 64a and each of the two speaker units 26 are disposed to act on each of the first and second ports, independently of each other between both the systems.

Therefore, the video-apparatus mounting table 50 is available as a speaker that is compact in size has a sufficiently high replay function for lower-band sound. Specifically, the support member can be used as an acoustic pipe or a member that provides an acoustic capacity, which will eliminate the necessity of increasing the volume and weight of the mounting table. Still, the support member and the others are formed to produce a Helmholtz resonance, thereby particularly providing an increased efficiency in a lower band of sound and remarkably improving quality of replayed sound. Furthermore, a plurality of speaker units 26 are placed and the sound emitted from the individual speaker units 26 is emitted via the separate aperture ports 61 and 61a, which therefore makes it possible to perform a stereophonic replay.

(Third embodiment)

Referring to Figs. 7 to 9, a third embodiment of the speaker-provided mounting table will now be explained. Fig. 7 shows an external view of a video-apparatus mounting table 100 according to the third embodiment, Fig. 8 shows the right side view of the video-apparatus mounting table shown in Fig. 7, and Fig. 9 shows the rear view of the video-apparatus mounting table shown in Fig. 7. Similarly to the first and second embodiments, for the sake of making the following explanation easier, a forward direction and a backward direction are defined on the direction going away from the front or back of the vide apparatus shown in Fig. 7.

As shown in Fig. 7, the video-apparatus mounting table 100, which serves as the speaker-provided mounting table according to the third embodiment, includes a rectangular pedestal 110, support members 120 and 125, and four casters 130 for movements. The pedestal 110 is placed on which a video apparatus 5 is mounted. The support members 120 and 125 are in charge of supporting the video apparatus 5 perpendicularly mounted on the pedestal 110. On the four

corners of the outer bottom of the pedestal 110 are secured the four casters 130, respectively. Each of the support members 120 and 125 is shaped into a hollow tube. The support members 120 and 125 are perpendicularly built on the pedestal 110 at specific intervals in parallel or obliquely to each other.

A mechanism for detachably holding the video apparatus 5 is placed on upper frontal parts of the support members 120 and 125. Hence the video apparatus 5 can be mounted onto or removed from the upper frontal part of the support member 120 and 125. In the support members 120 and 125 are opened, respectively, aperture ports 121 and 126 to emit sound therefrom. In addition, in an upper side of each of the support members 120 and 125 (in this embodiment, the upper sides that face to each other), openings 122 and 127 are formed respectively. The opening 122 and 127 are positioned so that a predetermined distance is secured from each of the openings 122 and 127 to each of the aperture ports 121 and 126. For instance, such distance is determined to be equal between one route from the opening 122 to the aperture port 121 and the other route from the opening 127 to the aperture port 126. To each of the openings 122 and 127 is connected one end of each of connection members 124 and 129 in each of which there is formed an acoustic capacity cavity 123 (128) having a predetermined amount of capacity. The remaining end of each of the connection members 124 and 129 is coupled with each of the two separate speaker units 26. Each speaker unit 26 is positioned face to face to each of the connection members 124 and 129 in the acoustic emitting direction. Each of the connection members 124 and 129 may be solely formed to connect with each of the support members 120 and 125, or integrally formed with each of the support members 120 and 125.

Each of the aperture ports 121 and 126 is positioned in each of the support members 120 and 125 such that a frequency to cause a Helmholtz resonance can be set to a limit necessary to replay a lower-band sound, the Helmholtz resonance being caused on both of an acoustic mass inside each of the support members 120 and 125 and an acoustic compliance from each of the acoustic capacity cavities 123 and 128. In cases where the video-apparatus mounting table 100 is used as means for generating a pipe resonance, each of the aperture openings

121 and 126 is formed at a specific position where the distance between each speaker unit 26 and each of the aperture port 121 and 126 is determined to have a resonance frequency necessary for the pipe resonance.

An operation, which is given when the video-apparatus mounting table according to the present embodiment is made to function as an acoustic apparatus, will now be provided.

In response to the supply of an audio signal from the vide apparatus 5 to the input terminal 29 of each speaker unit 26, the sound that has been replayed is emitted from each speaker unit 26. The emitted sound undergoes a resonance caused by each of the acoustic capacity cavity 123 and 128 and an internal acoustic mass of each of the support members 120 and 125, the replayed sound that has experienced the resonance is transmitted to each of the aperture ports 121 and 126. The replayed sound is therefore emitted outward via each of the aperture ports 121 and 126.

As described above, the video-apparatus mounting table 100 according to the present embodiment is provided with the hollow-shaped support members 120 and 125, which have been generally used as a structure typical to a multipurpose mounting table. Additionally, each of the support members 120 and 125 is provided with the speaker unit 26 in order to use the support member 120 (125) as an acoustic pipe. Moreover, the support members 120 and 125 (including the connection members 124 and 129, respectively) are made to operate as means for a Helmholtz resonance or a pipe resonance on audio signals.

Therefore, the video-apparatus mounting table 100 is available as a speaker that is compact in size has a sufficiently high replay function for a lower-band sound. Specifically, the support members can be used as acoustic pipes or members for providing an acoustic capacity, which will eliminate the necessity of increasing the volume and weight of the mounting table. Still, the support members and the others are formed to produce a Helmholtz resonance, thereby particularly increasing efficiency in a lower band of sound and remarkably improving quality of replayed sound.

As described so far, the speaker-provided mounting table according to the present invention comprises, as shown in Fig. 1, a

pedestal 10; hollow-shaped support members 20 and 25 for supporting the pedestal 10; and a speaker unit 26 being equipped with the speaker and being attached on the support member 20, wherein the support member 20 is configured to be used as an acoustic pipe.

Accordingly, a hollow-shaped support member, which has been in general use as a structure for a multipurpose mounting table can be utilized to secure a speaker to the support member. This utilization makes it possible to use he support member as an acoustic pipe as well. Hence, with almost no increase in the volume and weight of the mounting table, a speaker-provided mounting table is realized, without lowering the strength of the mounting table. Further, since the Helmholtz resonance can be provided by the use of the hollow pipe and others, efficiency in emitting a lower-band sound is enhanced in particular and sound quality is also upgraded.

Further, the speaker unit 26 uses a dynamic electricity type of speaker or a piezoelectric type of speaker.

Hence, to use the dynamic electricity type of speaker enables the output of sound of which dynamic range is wider. Using the piezoelectric type of speaker, only a remarkably small amount of volume is occupied by the speaker, which makes it easier to install the speaker onto the mounting table. Additionally, the entire weight of the mounting table can be reduced noticeably.

The support member 20 is provided with an acoustic capacity cavity 23 for causing a resonance together with an inner acoustic mass of the support member 20 and aperture ports 21 for emitting the sound caused by the acoustic capacity cavity 23.

This enables use of, an acoustic pipe, a hollow-shaped support member that has been generally used as a structure for a multipurpose mounting table.

Moreover, the support member 20 is configured to respond to an audio signal inputted to the input terminal 29 of the speaker unit 26 so that the support member 20 has a function of performing a Helmholtz resonance or a pipe resonance.

This construction causes the support member to operate as means for performing the Helmholtz resonance or the pipe resonance. It is therefore possible to raise sound quality to a great degree, compared to

that obtained when the speaker is driven alone. Still, the Helmholtz resonance is provided by the use of the hollow pipe and others, so that efficiency in emitting a lower-band sound can be enhanced in particular, and sound quality can also be upgraded.

By the acoustic capacity cavity 23 and the aperture ports 21 and 21, a frequency to cause a Helmholtz resonance can be set to a limit necessary to replay a lower-band sound, the Helmholtz resonance being caused on both of an acoustic mass inside the support member 20 (within the acoustic pipe) and an acoustic compliance from the acoustic capacity cavity 23 functioning as an acoustic capacity part. The thus-set frequency is given to the support member 20.

Accordingly, a frequency to cause the Helmholtz resonance can be set to a limit necessary to replay a lower-band sound, which allows the lower-band sound to be enhanced.

Furthermore, a distance between the speaker unit 26 and each of the aperture ports 21 is determined in agreement with a resonance frequency necessary for either a Helmholtz resonance or a pipe resonance.

Thus, this construction causes the support member to operate as means for performing the Helmholtz resonance or the pipe resonance. It is therefore possible to raise sound quality to a great degree, compared to that obtained when the speaker is driven alone. Still, the Helmholtz resonance is provided by the use of the support member and others, so that efficiency in emitting a lower-band sound can be enhanced in particular, and sound quality can also be upgraded.

Still, as shown in Fig. 7, the speaker-provided mounting talbe100 is provided a plurality of casters 130 to allow the mounting table 100 to be movable on the ground.

It is therefore possible to move the speaker-provided mounting table with ease.

As mentioned above, the foregoing embodiments employ the configuration in which there is provided a pedestal; a hollow-shaped support member for supporting the pedestal; and a speaker unit being equipped with the speaker and being attached on the support member, wherein the support member is configured to function as either an acoustic pipe or an acoustic capacity. The lower-band sound can

therefore be enhanced for emission in an easier manner, with almost no increase in the volume and weight of the mounting table (for instance, the video-apparatus mounting tables 1, 50 and 100).

The present invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The above embodiments and modifications are therefore to be considered in all respects as illustrative and not restrictive, the scope of the present invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

By way of example, the aperture port opened at a specified position on a surface of the support member may be rectangular, circular, or any other arbitrarily selected shape. Similarly, the outer shapes of the support members, connection members, speakers, and/or others may be modified freely.

Sill a further modification is that both ends of the support member are charged with a sound absorbing material and closed to produce a closed box state. As a result, the inner cavity of the support member can be used as a back chamber (cabinet) for a speaker.

Through the foregoing various types of embodiments, the present invention can therefore be summarized such that a hollow-shaped support member is additionally in charge of a pipe resonance, both an acoustic mass inside a hollow-shaped support member and an acoustic capacity cavity of a member other than such support member are responsible for generation of a Helmholtz resonance, and the inner capacity of a hollow-shaped support member is used as a back chamber (cabinet) for the speaker.

The entire disclosure of Japanese Patent Application No. 2002-200102 filed on July. 9, 2002 including the specification, claims, drawings and summary is incorporated herein by reference in its entirety.